Original Research Article

Study of left ventricular diastolic dysfunction in preeclampsia patients

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Abstract

Introduction: Preeclampsia is an acute increase in blood pressure during the second half of pregnancy which is short-lived. More than 50% of the women with elevated blood pressure during pregnancy return to normal by 6-12 weeks postpartum **Aims and Objectives:** To Study Left Ventricular Diastolic Dysfunction in preeclampsia patients. **Methodology:** After approval from institutional ethical committee this cross-sectional study was carried out in the patients of Preeclampsia referred for the Cardiovascular hemodynamic at tertiary health care centre. All the patients with the written explained consent were enrolled for the study during the one year duration i.e. June 2016 to June 2017. During the one year 25 random patients with preeclampsia and 25 random patients with normal pregnancy were enrolled into the study. All the patients under gone 2-D echocardiographic evaluation thoroughly. The statistical analysis done by unpaired t-test and calculated by SPSS 19 version software. **Result:** The average age was 29.35± 5.62 and 27.32 ±6.12 Yrs. and BMI was 25.21± 4.12 and 26.12 ± 5.12 which was comparable with each other (p>0.05). The diastolic parameters like E wave, m/s were 0.6123 ± 0.132 and 2.912 ± 0.131 (p>0.05), A Wave, m/s - 0.732 ± 0.231 and 1.342 ± 0.232 (p>0.001), E/A ratio-1.12 ± 0.342 and 2.121 ± 0.652 (p>0.72), E Dec time, ms -121 ± 8.32 and 197.22 ± 52.32 (p>0.01), IVRT, ms-83.52 ± 7.32 and 99.21 ± 9.42 (p>0.01), E VTI, ms-13.12 ± 1.51 and 14.51± 7.21 (p>0.85), A VTI, ms-2.76 ± 0.45 and 7.98 ± 3.1 (p>0.01). **Conclusion:** Cardiac diastolic dysfunction found very common in women with preeclampsia If this cardiovascular dysfunction can be picked by an echocardiography in preeclamptic women, it may be possible to reduce the risk of heart failure by early intervention.

Key Words: Diastolic Dysfunction, preeclampsia patients, heart failure.

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INTRODUCTION

Preeclampsia is an acute increase in blood pressure during the second half of pregnancy which is short-lived. More than 50% of the women with elevated blood pressure during pregnancy return to normal by 6-12 weeks postpartum. In developing countries preeclampsia ranks second to anaemia as a cause of maternal morbidity and mortality complicating 7-10% of all pregnancies. Preeclampsia is associated with both immediate and long term postpartum morbidity and mortality due to cardiac related issues.[1] The pathological changes in this disorder are primarily ischemic in nature and are known to affect the placenta, kidney, liver and brain whereas there is scant and conflicting information about the impact on heart. Preeclampsia causes left ventricle dysfunction and myocardial injury. Significant proportion of preeclamptic patients show cardiopulmonary morbidity and autopsy data have a 10-fold higher prevalence of myocardial contraction and band necrosis than deaths in pregnancy due to other causes. A pregnancy complicated by preeclampsia identifies both mother and child with an unusual predisposition to develop cardio vascular diseases.[2,3] Preeclampsia is one of the most common medical disorders in pregnancy, the incidence being 2-

7%[4]. Various complications associated with preeclampsia are eclampsia, cerebrovascular accidents, renal failure and pulmonary oedema. Preeclampsia can affect the maternal heart too. The physiological changes of pregnancy like tachycardia increase in cardiac output and decrease in peripheral vascular resistance can further mimic the symptoms of heart failure. Heart failure in pregnancy is most commonly due to pre-existing heart disease. In India, the important causes are valvular heart disease especially mitral stenosis and congenital heart disease. Some cases may be also due to heart diseases that develop in pregnancy, most important of which is peripartum cardiomyopathy. Cardiac dysfunction, both systolic and diastolic is known to occur in hypertension. Diastolic dysfunction usually precedes systolic dysfunction[5,6,7]. We speculated that preeclampsia may be responsible for some cases of heart failure occurring in late pregnancy and early puerperium. If we can identify any form of cardiac dysfunction along with its severity during early pregnancy, it may be possible to prevent progression of the condition and save mother from severe morbidity of acute heart failure [8].

MATERIAL AND METHODS

After approval from institutional ethical committee this cross-sectional study was carried out in the patients of Preeclampsia referred for the Cardiovascular hemodynamic at tertiary health care centre. All the patients with the written explained consent were enrolled for the study during the one year duration i.e. June 2016 to June 2017. During the one year 25 random patients with preeclampsia and 25 random patients with normal pregnancy were enrolled into the study. All the patients under gone 2-D echocardiographic evaluation thoroughly. The statistical analysis done by unpaired t-test and calculated by SPSS 19 version software.

RESULT

Table 1: Distribution of the patients as per the baseline parameters

Parameter	Normotensive (n = 25)	Hypertensive (n = 25)	p-value
Age (Yrs.)	29.35± 5.62	27.32 ±6.12	p>0.05
BMI	25.21± 4.12	26.12 ± 5.12	p>0.05

The average age was 29.35± 5.62 and 27.32 ±6.12 Yrs. and BMI was 25.21± 4.12 and 26.12 ± 5.12 which was comparable with each other (p>0.05).

Table 2: Distribution of the patients as per the diastolic parameters

Parameter	Normotensive (n = 35)	Hypertensive (n = 35)	P value
E wave, m/s	0.6123 ± 0.132	2.912 ± 0.131	0.05
A Wave, m/s	0.732 ± 0.231	1.342 ± 0.232	0.001
E/A ratio	1.12 ± 0.342	2.121 ± 0.652	0.72
E Dec time, ms	121 ± 8.32	197.22 ± 52.32	0.01
IVRT, ms	83.52 ± 7.32	99.21 ± 9.42	0.01
E VTI, ms	13.12 ± 1.51	14.51± 7.21	0.85
A VTI, ms	2.76 ± 0.45	7.98 ± 3.1	0.01

The diastolic parameters like E wave, m/s were 0.6123 ± 0.132 and 2.912 ± 0.131 (p>0.05), A Wave, m/s - 0.732 ± 0.231 and 1.342 ± 0.232 (p>0.001), E/A ratio-1.12 ± 0.342 and 2.121 ± 0.652 (p>0.72), E Dec time, ms -121 ± 8.32 and 197.22 ± 52.32 (p>0.01), IVRT, ms-83.52 ± 7.32 and 99.21 ± 9.42 (p>0.01), E VTI, ms-13.12 ± 1.51 and 14.51± 7.21 (p>0.85), A VTI, ms-2.76 ± 0.45 and 7.98 ± 3.1 (p>0.01).

DISCUSSION

Preeclampsia is a multisystem disorder that can affect almost every organ. Association between preeclampsia and cardiovascular morbidity has been highlighted in various studies[9,10]. Acute cardiovascular complications occur in around 6% of patients with severe preeclampsia[11,12]. Diastolic dysfunction usually precedes the compromise of systolic function in hypertension and can lead to heart failure or pulmonary oedema[12]. If this cardiovascular dysfunction can be picked by an echocardiography in preeclamptic women, it may be possible to reduce the risk of heart failure by early intervention. In our study we have seen that The average age was 29.35± 5.62 and 27.32 ±6.12 Yrs. and BMI was 25.21± 4.12 and 26.12 ± 5.12 which was comparable with each other (p>0.05). The diastolic parameters like E wave, m/s were 0.6123 ± 0.132 and 2.912 ± 0.131 (p>0.05), A Wave, m/s - 0.732 ± 0.231 and 1.342 ± 0.232 (p>0.001), E/A ratio-1.12 ± 0.342 and 2.121 ± 0.652 (p>0.72), E Dec time, ms -121 ± 8.32 and 197.22 ± 52.32 (p>0.01), IVRT, ms-83.52 ± 7.32 and 99.21 ± 9.42 (p>0.01), E VTI, ms-13.12 ± 1.51 and 14.51± 7.21 (p>0.85), A VTI, ms-2.76 ± 0.45 and 7.98 ± 3.1 (p>0.01). These findings are similar to Tanuja Muthyala [13] *et al* they found Of 120 women with preeclampsia, 61 had mild preeclampsia and 59 had severe preeclampsia. Diastolic dysfunction was seen in 25(20.8%) cases. Among these, grade I diastolic dysfunction was seen in 40% and the rest 60% had grade II diastolic dysfunction. In the mild preeclampsia group, only 2(3.3%) patients had diastolic dysfunction. Both had grade I dysfunction. Of severe preeclampsia patients, 8(13.6%) had grade I and 15(25.4%) had grade II diastolic dysfunction

(p=0.001). None of these progressed to heart failure or pulmonary oedema. Systolic function assessed by left ventricular ejection fraction was normal in all cases. All controls had normal systolic and diastolic functions.

CONCLUSION

Cardiac diastolic dysfunction found very common in women with preeclampsia If this cardiovascular dysfunction can be picked by an echocardiography in preeclamptic women, it may be possible to reduce the risk of heart failure by early intervention.

REFERENCES

1. Bauer ST, Clearly KL. Cardiopulmonary complications of preeclampsia. Semin Perinatol. 2009; 33:158-165.
2. Bellamy L, Casas JP, Hingorani AD, WilliamsDJ. Pre-eclampsia and risk of cardiovascular disease disease and cancer in later in life:systematic view and meta-analysis. BMJ. 2007; 335:974.
3. Davis EF, Lazdam M, Lewandowski AJ, Worton SA, Kelly B, Ken-worthy Y et al. Cardiovascular risk factors in children and young adults born to preeclampticpregnancies: a systematic review. Pediatrics. 2012; 129:e1552-e1561.
4. Sibai BM. Diagnosis and management of gestational hypertension and preeclampsia. Obstet Gynecol. 2003; 102:181-92.
5. Melchiorre K, Sutherland GR, Baltabaeva A, Liberati M, Thilaganathan B. Maternal cardiac dysfunction and remodeling in women with preeclampsia at term. Hypertension. 2011; 57:85-93.
6. Tangeda P, Shastri N. Maternal left ventricular systolic and diastolic function during second trimester of pregnancy with preeclampsia. Journal of Dr. NTR University of Health Sciences. 2015; 4:224-28.
7. Valensise H, Vasapollo B, Novelli GP, Pasqualetti P, Galante A, Arduini D. Maternal total vascular resistance and concentric geometry: a key to identify uncomplicated gestational hypertension. BJOG. 2006; 113:1044-52.
8. Melchiorre K, Thilaganathan B. Maternal cardiac function in preeclampsia. Curr Opin Obstet Gynecol. 2011; 23:440-47.
9. Solanki R, Maitra N. Echocardiographic assessment of cardiovascular haemodynamics in preeclampsia. J Obstet Gynaecol India. 2011; 61:519-22.
10. Simmons LA, Gillin AG, Jeremy RW. Structural and functional changes in left ventricle during normotensive and preeclamptic pregnancy. Am J Physiol Heart Circ Physiol. 2002;283:H1627-33
11. Maurer MS, Spevack D, Burkhoff D, Kronzon I. Diastolic dysfunction: can it be diagnosed by Doppler echocardiography? J Am Coll Cardiol. 2004; 44:1543-49.
12. Tanuja Muthyala, Saurabh Mehrotra, Pooja Sikka, Vanita Suri. Maternal Cardiac Diastolic Dysfunction by Doppler Echocardiography in Women with Preeclampsia. Journal of Clinical and Diagnostic Research. 2016 Aug, Vol-10(8): 1-3.

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